

**TRAINING PROGRAM OF INSTRUCTION
(TPI)**

FOR

AFIS-PMQCC

**PHOTOGRAPHIC MAINTENANCE AND QUALITY CONTROL
COURSE**

Approved by:

//SIGNED//

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Director of Training
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PHOTOGRAPHIC MAINTENANCE AND QUALITY CONTROL COURSE
TRAINING PROGRAM of INSTRUCTION

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TRAINING PROGRAM OF INSTRUCTION

Preface

TRAINING PROGRAM OF INSTRUCTION FILE NUMBER: AFIS-PMQCC

TITLE: Photographic Maintenance and Quality Control Course

TRAINING LOCATION: Fort George G. Meade, Maryland

SPECIALTY AWARDED: USN NEC 8133

PURPOSE: This course is designed to provide common core photographic processing, maintenance, and quality control fundamentals training.

COURSE DESCRIPTION: The Photographic Maintenance Quality Control Course (PMQCC) provides in-depth training in the maintenance of photographic equipment (MPE) and quality control (QC) of photographic processing functional areas. This course comprises elements of the former Photographic Processing Maintenance/Quality Control and Photographic Maintenance Technician courses.

The scope of training for the MPE functional area includes direct and alternating electrical current, basic soldering techniques, schematic reading, and mechanical fundamentals for photographic processors. Specialized training in the MPE area includes operation, maintenance and repair procedures for the Versamat 1140 aerial film/paper processor.

The scope of training for the QC functional area includes quality control procedures for black & white and color processors incorporating Sensitometry, Densitometry, chemical replenishment monitoring and logarithms. It also includes color theory of light and quality control as they relate to photographic films, photographic paper and associated chemical processes. Mini-Lab quality control covers initial set-up, processor master balance, channel balancing and internal diagnostics. Color management for digital imaging incorporates chromaticity charts, color spaces, and gamut mapping. The course incorporates color management hardware and software to characterize and calibrate input and output devices, and building International Color Consortium (ICC) profiles using color management software.

Practical exercises in the MPE include troubleshooting and repairs of Versamat and color processor electrical circuits, processor systems, crossovers, and racks. Practical exercises in the QC functional area include sensitometric curve analysis, construction and use of control charts, construction and use of time/gamma charts, and the pH meter. Continuous Contact printer QC is evaluated through the generation of printer curves and their analysis. Students monitor the C-41 and RA-4 processes using QC software. Mini-lab QC includes initial set-up, master balance, channel balance and internal diagnostics procedures. Color Management QC includes building ICC profiles for monitors, scanners, and printers using color management software. Students characterize and calibrate input and output devices. Emphasis is placed on all safety precautions and practices.

PREREQUISITES:

USN: E3-E6, Photographer's Mate; GS-5 – 7 (1060 series) Prerequisites – Photographer's Mate with one year experience; ASVAB scores ASF/50, MC/50. Current CPR Certification. Recommended but not required: completion of Navy Correspondence Course *Tools and Their Uses*.

USMC: E3-E6, follow-on course for MOS 4641, Combat Photographic Specialist. Prerequisite – MOS 4641 or 4671.

USAF: E1-E6, Still Photographer; GS-9 (1060, 1071, 1084 Series) and selected WG 4-10 Civilians. Prerequisite: - Secret clearance; BSP (USAF students to attend only QC Module)

SECURITY CLEARANCE: USAF: Secret clearance

CLASS SIZE:

MAXIMUM	8
MINIMUM	4
ANNUAL COURSE CAPACITY	64

COURSE LENGTH: 53 Training Days

ACADEMIC HOURS:	418 Hrs
ADMINISTRATIVE HOURS:	6 Hrs
TOTAL COURSE HOURS:	424 Hrs

INSTRUCTOR CONTACT HOURS: 650.5 Hrs

TYPE/METHOD OF INSTRUCTION:

Administrative (AD) – 6 Hrs

Lecture (CL) – 107 Hrs

Demonstration (D) – 28.5 Hrs

Performance Exercise (PE) - 194.5 Hrs

Written (EW) – 11 Hrs

Performance Evaluation (EP) – 32 Hrs

Computer-Aided Instruction (CAI) – 45 Hrs

TRAINING START DATE: January 2002

ENVIRONMENTAL IMPACT: None. DoD policy was followed to assess the environmental impact.

MANPOWER: The Interservice Training Review Organization (ITRO) formula was used to determine the number of instructors required.

EQUIPMENT and FACILITIES: The Course Design Resource Estimate (CDRE) for PPMQC and PMT contains this information.

TRAINING DEVELOPMENT PROPONENT: American Forces Information Service, Training Directorate, (AFIS/TD): (703) 428-0607; DSN 328-0607

FUNCTIONAL AREA 1 MAINTENANCE PREREQUISITES

TPFN: AFIS-PMQCC-001-001-

UNIT TITLE: Maintenance Safety Practices

TPFN HOURS AND TYPE: 2 L

TPFN TOTAL HOURS: 2

PREREQUISITE TPFN: None

TASK (S): 001 Recognize electrical and mechanical safety measures.
002 Identify environmental safety and hazardous materials (HAZMAT).

SUMMARY OF INSTRUCTION: The students identify the basic facts and principles of hand tool safety. The class discusses the definition of safety, cause and effects of accidents and responsibilities of the individual and of superiors. Mechanical hazards are reviewed, along with a discussion of how to reduce them. The students learn the basic facts and principles of electrical safety, the precautions to use when working on energized circuits, and how to deal with electrical fires. Finally, the class discusses factors of environmental safety and HAZMAT, to include chemical safety, the Federal Hazard Communication Standard, and Material Safety Data Sheets. The information in this unit is measured with a written exam at the end of the functional area (AFIS-PMT-001-003-). A minimum score of 100 percent must be obtained on all safety questions.

REFERENCES:

NAVEDTRA 10085, *Tools and Their Uses*

E0410-AA-HBK-010/00K ELEXSAFE, *Electronic Safety Handbook*

AFOSHSTD151-21.1W, *Department of Defense Federal Hazard Communication Training Program: Student Workbook*

OSHA Standard, Code of Federal Regulations (CFR), Title 29, parts 1900 to 1910

OSHA Standard, Code of Federal Regulations (CFR), Title 29, part 1910

INSTRUCTOR/STUDENT RATIO: 1:8 (L)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 2
DIRECT CURRENT FUNDAMENTALS

TPFN: AFIS-PMQCC-002-001-

UNIT TITLE: Basic Direct Current Circuits

TPFN HOURS AND TYPE: 18 CAI

TPFN TOTAL HOURS: 18

PREREQUISITE TPFN: None

TASK (S):

001	Identify voltage and current.
002	Identify resistive components.
003	Calculate unknown values in a series direct current circuit.
004	Troubleshoot a series direct current.
005	Calculate unknown values in a parallel direct current circuit.
006	Troubleshoot a parallel direct current circuit.
007	Calculate unknown values in a series-parallel direct current circuit.
008	Troubleshoot a series-parallel direct current circuit.

SUMMARY OF INSTRUCTION: Using the NIDA CAI Program, the students learn to identify statements concerning the basic facts and principles of voltage, current, and resistive components in direct current circuits. Building on this knowledge, the students then calculate unknown values for a series direct current circuit, a parallel direct current circuit, and a series-parallel direct current circuit. After calculating these values, the students then troubleshoot each of these DC circuits with the NIDA CAI program. This knowledge is measured with a written exam at the end of the functional area (AFIS-PMT-002-005-).

REFERENCES:

NIDA CAI Program

NIDA Text Manual for DC Circuits

NIDA Electronics Reference Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (CAI)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 2

DIRECT CURRENT FUNDAMENTALS

TPFN: AFIS-PMQCC-002-002-

UNIT TITLE: Meter Movements and Voltage, Current, and Resistive Measurements

TPFN HOURS AND TYPE: 8 CAI

TPFN TOTAL HOURS: 8

PREREQUISITE TPFN: None

TASK (S): 001 Identify multimeter/meter movements.
002 Perform voltage, current, and resistive movements.

SUMMARY OF INSTRUCTION: The students participate in an introduction to multimeter principles and meter movements. Using the NIDA Text Manual for DC Circuits, the class identifies the principles of magnetism and electromagnetism, distinguishes between analog and digital multimeters, and learns meter loading. Building on this instruction, the students then perform voltage, current, and resistance measurements. This knowledge is measured with a written test at the end of the functional area (AFIS-PMT-002).

REFERENCES:

NIDA CAI Program

NIDA Text Manual for DC Circuits

NIDA Electronics Reference Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (CAI)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 3
ALTERNATING CURRENT FUNDAMENTALS

TPFN: AFIS-PMQCC-003-001-

UNIT TITLE: Alternating Current Circuits

TPFN HOURS AND TYPE: 10.5 CAI

TPFN TOTAL HOURS: 10.5

PREREQUISITE TPFN: None

TASK (S):

001	Identify alternating current circuits.
002	Calculate unknown values of alternating current circuits.
003	Identify multi-phase circuits.
004	Identify inductive circuits.
005	Identify capacitive circuits.
006	Identify resistive, capacitive and inductive (RCL) circuits.

SUMMARY OF INSTRUCTION: Using the NIDA CAI program, the students identify basic facts and principles of alternating current circuits. Instruction includes the Sine Wave and its calculations, generating AC electricity operational theory of multi-phase circuits, to include use of an oscilloscope. The students also identify the basic facts, principles, and values relating to both inductive and capacitive circuits. The students then calculate selected unknown values in AC circuits, including series, parallel, and series-parallel resistance. This knowledge is measured with a written exam at the end of the functional area (AFIS-PMT-003-003-).

REFERENCES:

NIDA CAI Program

NIDA Text Manual for AC Circuits

NIDA Electronics Reference Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (CAI)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 3
ALTERNATE CURRENT FUNDAMENTALS

TPFN: AFIS-PMQCC-003-002-

UNIT TITLE: Special Components

HOURS AND TYPE: 8.5 CAI

TPFN TOTAL HOURS: 8.5

PREREQUISITE TPFN: None

TASK (S):

001	Identify transformers.
002	Identify relays and solenoids.
003	Identify AC motors and generators.
004	Identify DC motors and generators.

SUMMARY OF INSTRUCTION: Using the NIDA CAI program, the students identify the characteristics and principles of a transformer. Building on this introduction, the students calculate the values in a transformer circuit. The students identify basic facts and principles of both relays and solenoids, including purpose, types, construction, and operation. Identify basic facts and principles of DC and AC motors, and basic generators. The students learn basic theory and introduction to both DC and AC motors. Building on this instruction, the students troubleshoot AC/DC motors and generators. This knowledge is measured with a written exam at the end of the functional area (AFIS-PMT-004-006-).

REFERENCES:

NIDA CAI Program

NIDA Text Manual for AC Circuits

NIDA Electronics Reference Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (CAI)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 4 ELECTRICAL CONNECTIONS

TPFN: AFIS-PMQCC-004-001-

UNIT TITLE: Soldering and Assembling Connectors

TPFN HOURS AND TYPE: 5 PE; 5 EP

TPFN TOTAL HOURS: 10

PREREQUISITE TPFN: None

TASK (S): 001 Solder/desolder electrical/electronic components.
002 Assemble solderless connections.

SUMMARY OF INSTRUCTION: The students describe soldering, soldering safety, tinning, and soldered connection characteristics. Building on these principles, the students solder and desolder electrical/electronic components, then assemble solderless connectors. The students describe splices, types of insulation, crimping terminal lugs, and electrical diagrams. This exercise must be performed IAW the student guide performance sheet.

REFERENCES:

AFIS-PMT Student Guide, DINFOS

NASA Requirements for Soldered Connections

INSTRUCTOR/STUDENT RATIO: 1:4 (PE, EP)

SAFETY FACTORS: The students must adhere to all applicable safety requirements and precautions while assembling solderless connectors and conducting soldering/desoldering operations.

FUNCTIONAL AREA 5 PHOTOGRAPHIC PROCESSES

TPFN: AFIS-PMQCC-005-001-

UNIT TITLE: Black and White Aerial Film Processor

TPFN HOURS AND TYPE: 20 L; 60 PE; 4 EP

TPFN TOTAL HOURS: 84

PREREQUISITE TPFN: None

- TASK (S):**
- 001 Identify main drive, replenishment, developer, and recirculation, wash and air recirculation system.
 - 002 Operate, troubleshoot, repair, calibrate, main drive, replenishment developer, recirculation, wash and air circulation system.
 - 003 Disassemble and reassemble racks and dryer box.
 - 004 Identify electrical system.
 - 005 Troubleshoot and repair electrical system.

SUMMARY OF INSTRUCTION: The students identify theory of operation statements concerning roller transport B&W aerial film processors. Building on this knowledge, the students troubleshoot, repair, and calibrate a roller transport B&W aerial film processor using applicable safety precautions, electrical test equipment, manufacturer's manual, and procedures stated in the *AFIS-PMT Student Guide*. Students' skill competency is measured using a performance examination. The students must meet the minimum standards of the performance checklist.

REFERENCES:

AFIS-PMT Student Guide, DINFOS

Kodak Versamat Film Processor Operating Manual

Kodak Versamat Film Processor Service Information Manual

INSTRUCTOR/STUDENT RATIO: 1:8 (L); 1:4 (PE, EP)

SAFETY FACTORS: The students must adhere to all applicable safety requirements and precautions while using hand tools and working around electricity.

FUNCTIONAL AREA 5 PHOTOGRAPHIC PROCESSES

TPFN: AFIS-PMQCC-005-002-

UNIT TITLE: Roller Transport Color Print Processor

TPFN HOURS AND TYPE: 2 L; 9 PE; 1 EP

TPFN TOTAL HOURS: 12

PREREQUISITE TPFN: None

TASK (S): 001 Describe operation of a color print processor.
002 Troubleshoot and repair a color print processor.

SUMMARY OF INSTRUCTION: The students identify theory of operation statements concerning roller transport color print processors. Building on this knowledge, the students troubleshoot, repair, and calibrate a roller transport color print processor using applicable safety precautions, electrical test equipment, manufacturer's manual, and procedures stated in the *AFIS-PMT Student Guide*. Students' skill competency is measured using a performance examination. The students must meet the minimum standards of the performance checklist.

REFERENCES:

AFIS-PMT Student Guide, DINFOS

Kreonite ProMate Processor Operator's Manual

INSTRUCTOR/STUDENT RATIO: 1:8 (L); 1:4 (PE, EP)

SAFETY FACTORS: The students must adhere to all applicable safety requirements and precautions while using hand tools and working around electricity.

FUNCTIONAL AREA 5

PHOTOGRAPHIC PROCESSES

TPFN: AFIS-PMQCC-005-003-

UNIT TITLE: Roller Transport Film Processor

TPFN HOURS AND TYPE: 3 L; 11 PE; 2 EP

TPFN TOTAL HOURS: 16

PREREQUISITE TPFN: None

TASK(S): 001 Describe the operation of a color film processor.
002 Troubleshoot and repair a color film processor.

SUMMARY OF INSTRUCTION: The students identify theory of operation statements concerning roller transport color film processors. Building on this knowledge, the students troubleshoot, repair, and calibrate a roller transport color film processor using applicable safety precautions, electrical test equipment, manufacturer's manual, and procedures stated in the *AFIS-PMT Student Guide*. Students' skill competency is measured using a performance examination. The students must meet the minimum standards of the performance checklist.

REFERENCES:

AFIS-PMT Student Guide, DINFOS
Noritsu QSF-410L, Operator's Manual

INSTRUCTOR/STUDENT RATIO: 1:8 (L); 1:4 (PE, EP)

SAFETY FACTORS: The students must adhere to all applicable safety requirements and precautions while using hand tools and working around electricity.

FUNCTIONAL AREA 5

PHOTOGRAPHIC PROCESSES

TPFN: AFIS-PMQCC-005-004-

UNIT TITLE: Color Printer/Processor

TPFN HOURS AND TYPE: 6 L; 14 PE; 4 EP

TPFN TOTAL HOURS: 24

PREREQUISITE TPFN: None

TASK(S): 001 Describe the operation of a color printer/processor.
002 Troubleshoot and repair a color printer/processor.

SUMMARY OF INSTRUCTION: The students identify theory of operation statements concerning color printer/processors. Building on this knowledge, the students troubleshoot, repair, and calibrate a color printer/processor using applicable safety precautions, electrical test equipment, manufacturer's manual, and procedures stated in the *AFIS-PMT Student Guide*. Students' skill competency is measured using a performance examination. The students must meet the minimum standards of the performance checklist.

REFERENCES:

AFIS-PMT Student Guide, DINFOS

Noritsu Quick Service System, Model QSS-613, Installation Manual

Noritsu Quick Service System, Model QSS-613, Operator's Manual

Noritsu Quick Service System, Model QSS-613, Alarm Messages/Key Operations

Noritsu Quick Service System, Model QSS-613, Parts List

Noritsu Quick Service System, Model QSS-613, Specifications

Noritsu Quick Service System, Model QSS-613, Service Manuals

INSTRUCTOR/STUDENT RATIO: 1:8 (L); 1:4 (PE, EP)

SAFETY FACTORS: The students must adhere to all applicable safety requirements and precautions while using hand tools and working around electricity.

FUNCTIONAL AREA 6
BLACK AND WHITE QUALITY CONTROL

TPFN: AFIS-PMQC-006-001-

UNIT TITLE: Construct a Control Chart

TPFN HOURS AND TYPE: 29 L; 17 PE

TPFN TOTAL HOURS: 46

PREREQUISITE TPFN: None

TASK(S):

001	Project 1 briefing.
002	Introduction to the Versamat.
003	Demonstrate Versamat operations.
004	Identify chemistry of processing.
005	Perform chemical safety procedures.
006	Know PM-25 Porta-Mixer operations.
007	Identify specific gravity (SG).
008	Identify pH.
009	Measure SG of working solutions and replenishers.
010	Measure pH of working solutions and replenishers.
011	Calculate replenishment rates.
012	Identify theory of replenishment.
013	Identify scientific notation.
014	Identify logarithms.
015	Identify theory of sensitometry.
016	Describe sensitometer operations.
017	Identify transmittance, opacity, and density.
018	Identify theory of densitometry.
019	Describe densitometer operations.
020	Identify characteristic curve.
021	Know how to find gamma, HD, and LD.
022	Identify processing uniformity and effects.
023	Associate control charts and standard deviation.
024	Construct control chart.
025	Compute aerial film speed.

SUMMARY OF INSTRUCTION: Students will learn to create sensitometric data and construct a control chart. Students will complete a written test on these tasks at the end of this Functional area (Ref:AFIS-PMQCC-006-005-001).

REFERENCES:

DoDINST 6050.5, DOD Hazard Communication Program, DoDINST 6065.1 Occupational Safety and Health Program, NAVAIR 10-40-2, Photographic Film and Paper Processing Machine EH-38D, NEVEDTRA 10069-d1, Mathematics Vol. 1, Technical Order 10E5-2-43-11, Technical Order 10E5-2-43-14, Student Guide Quality Control, Operating Instructions for EG&G Sensitometer, Operating Manual for Densitometer, Operators Manual for the pH Meter

INSTRUCTOR/STUDENT RATIO: 1:8(L); 1:4 (PE)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining the Versamat processor and all associated equipment.

FUNCTIONAL AREA 6
BLACK AND WHITE QUALITY CONTROL

TPFN: AFIS-PMQC-006-002-

UNIT TITLE: Family of Curves/Time vs. Gamma Chart

TPFN HOURS AND TYPE: 3 L; 4 PE

TPFN TOTAL HOURS: 7

PREREQUISITE TPFN: AFIS-PMQC-006-001

TASK(S):

001	Project II briefing.
002	Identify family of curves.
003	Identify time vs. gamma chart.
004	Expose, process, read, and plot family of curves.
005	Determine gamma for family of curves.
006	Construct time vs. gamma chart.

SUMMARY OF ACTIVITIES: Students learn to create sensitometric data and construct a family of curves and a time vs. gamma chart. Students complete a written test on these tasks at the end of this Functional Area (Ref: TPFN-PMQCC-006-005-001).

REFERENCES:

DoDINST 6050.5, DOD Hazard Communication Program, DoDINST 6065.1 Occupational Safety and Health Program, NAVAIR 10-40-2, Photographic Film and Paper Processing Machine EH-38D, Technical Order 10E5-2-43-11, Technical Order 10E5-2-43-14, Student Guide Quality Control

INSTRUCTOR/STUDENT RATIO: 1:8(L); 1:4 (PE)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining the Versamat processor and all associated equipment.

FUNCTIONAL AREA 6
BLACK AND WHITE QUALITY CONTROL

TPFN: AFIS-PMQCC-006-003-

UNIT TITLE: Processing Original Negatives

TPFN HOURS AND TYPE: 0.5 L; 16 PE

TPFN TOTAL HOURS: 16.5

PREREQUISITE TPFN: AFIS-PMQC-006-002

TASK(S): 001 Project III briefing.
002 Process original negatives.

SUMMARY OF ACTIVITIES: Students learn to process film to a specific contrast between the darkest and lightest areas of a photographic image. Students complete a written test on this task at the end of this Functional Area (Ref: AFIS-PMQCC-006-005-001).

REFERENCES:

DoDINST 6050.5, DOD Hazard Communication Program, DoDINST 6065.1 Occupational Safety and Health Program, NAVAIR 10-40-2, Photographic Film and Paper Processing Machine EH-38D, Technical Order 10E5-2-43-11, Technical Order 10E5-2-43-14, Student Guide Quality Control

INSTRUCTOR/STUDENT RATIO: 1:8(L); 1:4 (PE)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining the Versamat processor and all associated equipment.

FUNCTIONAL AREA 6
BLACK AND WHITE QUALITY CONTROL

TPFN: AFIS-PMQCC-006-004-

UNIT TITLE: Continuous Printer/Printer Curves

TPFN HOURS AND TYPE: 6 L; 6.5 PE

TPFN TOTAL HOURS: 12.5

PREREQUISITE TPFN: AFIS-PMQC-006-003-

TASK(S):

001	Project IV briefing.
002	Identify Colorado continuous printer.
003	Identify time vs. average gradient chart.
004	Project V briefing.
005	Construction and use of printer curves.
006	Demonstrate printer curves.

SUMMARY OF ACTIVITIES: Students learn to create sensitometric data and construct a normal set of curves. Students complete a written test on this task at the end of this Functional Area (Ref: AFIS-PMQC-006-005-001).

REFERENCES:

DoDINST 6050.5, DOD Hazard Communication Program, DoDINST 6065.1 Occupational Safety and Health Program, NAVAIR 10-40-2, Photographic Film and Paper Processing Machine EH-38D, Technical Order 10E5-2-43-11, Technical Order 10E5-2-43-14, Student Guide Quality Control

INSTRUCTOR/STUDENT RATIO: 1:8(L); 1:4 (PE)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining the Versamat processor and all associated equipment.

FUNCTIONAL AREA 6
BLACK AND WHITE QUALITY CONTROL

TPFN: AFIS-PMQCC-006-005-

UNIT TITLE: Measurement

TPFN HOURS AND TYPE: 3 EW

TPFN TOTAL HOURS: 3

PREREQUISITE TPFN: AFIS-PMQC-006-004

TASK(S): 001 Written test.
002 Written test – remedial.

SUMMARY OF ACTIVITIES: Students complete a written test covering tasks from TPFN AFIS-PMQC-006-001 through AFIS-PMQC-006-004. Students must attain a minimum score of 70 on the written test.

REFERENCES:

DoDINST 6050.5, DOD Hazard Communication Program, DoDINST 6065.1 Occupational Safety and Health Program, NAVAIR 10-40-2, Photographic Film and Paper Processing Machine EH-38D, NEVEDTRA 10069-d1, Mathematics Vol. 1, Technical Order 10E5-2-43-11, Technical Order 10E5-2-43-14, Student Guide Quality Control, Operating Instructions for EG&G Sensitometer, Operating Manual for Densitometer, Operators Manual for the pH Meter

INSTRUCTOR/STUDENT RATIO: 1:8(C/L); 1:4 (PE)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining the Versamat processor and all associated equipment.

FUNCTIONAL AREA 7
COLOR QUALITY CONTROL

TPFN: AFIS-PMQCC-007-001-

UNIT TITLE: Color Theory

TPFN HOURS AND TYPE: 5.5 L; 3.5 D

TPFN TOTAL HOURS: 9

PREREQUISITE TPFN: None

TASK(S):

001	Identify characteristics of light.
002	Identify color temperature.
003	Identify filters in photography.
004	Identify characteristics of color negative films.
005	Identify characteristics of color reversal films.
006	Identify characteristics of color printing papers.

SUMMARY OF ACTIVITIES: Students become familiar with light characteristics, the electromagnetic spectrum, and the definition and use of color temperature in photography. Students learn the definition and uses of various filters in color photography. Students learn the basic structure of color film and printing paper emulsions.

REFERENCES:

Student Guide AFIS-PMQCC-007-001

INSTRUCTOR/STUDENT RATIO: 1:8 (L); 1:8(D)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 7
COLOR QUALITY CONTROL

TPFN: AFIS-PMQCC-007-002-

UNIT TITLE: Color Processes/Monitoring

TPFN HOURS AND TYPE: 3 L; 7 D

TPFN TOTAL HOURS: 10

PREREQUISITE TPFN: AFIS-PMQCC-006-008

TASK(S):

001	Identify processing solutions and their effects: C-41, RA-4, .E -6.
002	Identify control strips.
003	Identify reference strips.
004	Demonstrate monitoring processes: C-41, RA-4.

SUMMARY OF ACTIVITIES: Students learn color process control by monitoring C-41 and RA-4 processes using manufacturers' control and reference strips.

REFERENCES:

DoDINST 6050.5, DOD Hazard Communication Program, DoDINST 6065.1 Occupational Safety and Health Program

Kodak Chemical Process C-41 Publication Z-131

Kodak Chemical Process RA-4 Publication Z-130

Kodak Chemical Process E-6 Publication Z-119

Noritsu Operator's Manual

Eseco Speedmaster Operator's Manual

Student guide AFIS-PMQCC-007-002

INSTRUCTOR/STUDENT RATIO: 1:8 (L); 1:8 (D)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining Noritsu processors, associated equipment and photographic chemicals.

FUNCTIONAL AREA 7

COLOR QUALITY CONTROL

TPFN: AFIS-PMQCC-007-003-

UNIT TITLE: Color Quality Control Chart

TPFN HOURS AND TYPE: 2 L; 4 D; 9. PE

TPFN TOTAL HOURS: 15

PREREQUISITE TPFN: AFIS-PMQCC-007-002

TASK(S):	001	Identify Y-55 plotting chart.
	002	Construct and plot Y-55 chart.
	003	Identify Kodak Z-Manuals.
	004	Identify control chart set-up.
	005	Construct a process control chart.
	006	Identify QC computer programs.

SUMMARY OF ACTIVITIES: Students learn to construct and plot a Kodak Y-55 chart for the purpose of processor certification. Students learn to construct and use a process control chart to track processor certification history and establish trends. Students become familiar with quality control computer software.

REFERENCES:

DoDINST 6050.5, DOD Hazard Communication Program, DoDINST 6065.1 Occupational Safety and Health Program
Kodak Chemical Process C-41 Publication Z-131
Kodak Chemical Process RA-4 Publication Z-130
Kodak Chemical Process E-6 Publication Z-119
Noritsu Operator's Manual
Eseco Speedmaster Operator's Manual
Student guide AFIS-PMQCC-007-003

INSTRUCTOR/STUDENT RATIO: 1:8 (L); 1:8 (D); 1:4 (PE)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining Noritsu processors, associated equipment and photographic chemicals.

**FUNCTIONAL AREA 7
COLOR QUALITY CONTROL**

TPFN: AFIS-PMQCC-007-004-

UNIT TITLE: Measurement

TPFN HOURS AND TYPE: 3 EW

TPFN TOTAL HOURS: 3

PREREQUISITE TPFN: AFIS-PMQCC-007-003

TASK(S): 001 Written test.
002 Written test – remedial.

SUMMARY OF ACTIVITIES: Students complete a written test covering tasks from TPFN AFIS-PMQCC-007-002 through AFIS-PMQCC-007-003. Students must attain a minimum score of 70 on the written test.

REFERENCES:

See AFIS PMQCC-007-001- through AFIS-PMQCC-007-003-

INSTRUCTOR/STUDENT RATIO: 1:8 (EW)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining Noritsu processors, associated equipment and photographic chemicals.

FUNCTIONAL AREA 8

AUTOMATED COLOR PROCESSORS

TPFN: AFIS-PMQCC-008-001

UNIT TITLE: Processor and Printer Operations

TPFN HOURS AND TYPE: 4 L; 8 D/L; 8 EP; 35 PE

TPFN TOTAL HOURS: 55

PREREQUISITE TPFN:

TASK(S):

001	Identify processor operations (Noritsu) control panel.
002	Demonstrate automated color printers (Noritsu) master balance.
003	Demonstrate automated color printers (Noritsu) channel balancing.
004	Demonstrate automated color printers (Noritsu) internal diagnostic.
005	Demonstrate automated color printers, new mini-lab technology.

SUMMARY OF ACTIVITIES: The students identify and demonstrate the proper procedure for set-up, master balance, channel balance, trouble shoot and monitor process control on the Noritsu 1501, 2611 mini-lab, 430 Film Processors.

REFERENCES:

DoDINST 6050.5, DOD Hazard Communication Program, DoDINST 6065.1 Occupational Safety and Health Program

Noritsu Quick Service System, Model QSS-1501ZU/QSF-V30/QSS-2611, Installation Manual

Noritsu Quick Service System, Model QSS-1501ZU/QSF-V30/QSS-2611, Operator's Manual

Noritsu Quick Service System, Model QSS-1501ZU/QSF-V30/QSS-2611, Alarm Messages/Key Operations

Noritsu Quick Service System, Model QSS-1501ZU/QSF-V30/QSS-2611, Parts List

Noritsu Quick Service System, Model QSS-1501ZU/QSF-V30/QSS-2611, Specifications

Noritsu Quick Service System, Model QSS-1501ZU/QSF-V30/QSS-2611, Service Manuals

INSTRUCTOR/STUDENT RATIO: 1:8 (L); 1:4 (D, PE)

SAFETY FACTORS: Adhere to all applicable safety requirements and precautions while operating and maintaining Noritsu processors, associated equipment and photographic chemicals.

FUNCTIONAL AREA 8
AUTOMATED COLOR PROCESSORS

TPFN: AFIS-PMQCC-008-002-

UNIT TITLE: Measurement

TPFN HOURS AND TYPE: 3 EW

TPFN TOTAL HOURS: 3

PREREQUISITE TPFN: AFIS-PMQCC-008

TASK(S): 001 Written test.
002 Written test – remedial.

SUMMARY OF ACTIVITIES: Students complete a written test covering tasks from TPFN AFIS-PMQCC-008-001 through AFIS-PMQCC-008-005. Students must attain a minimum score of 70 on the written test.

REFERENCES:

See AFIS-PMQCC-008-001

INSTRUCTOR/STUDENT RATIO: 1:8 EW

SAFETY FACTORS: Normal

FUNCTIONAL AREA 9
COLOR MANAGEMENT FOR DIGITAL IMAGING

TPFN: AFIS-PMQCC-009-001

UNIT TITLE: Color Management for Electronic Imaging Quality Control

TPFN HOURS AND TYPE: 8 L

TPFN TOTAL HOURS: 8

PREREQUISITE TPFN:

TASK(S): Identify and define color management:

- 001 Color management.
- 002 Chromaticity chart.
- 003 Color spaces.
- 004 Gamut mapping.
- 005 Environment.
- 006 Software profiles
- 007 Color management hardware

SUMMARY OF ACTIVITIES: The students identify the steps necessary for implementing color management and define each color space in a typical photographic workflow. Attention is given to the interpretation of color space models and their value in visually depicting device gamut.

REFERENCES:

Kodak Colorflow Profile Editor User's Guide and Reference

INSTRUCTOR/STUDENT RATIO: 1:8 (L)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 9
COLOR MANAGEMENT FOR DIGITAL IMAGING

TPFN: AFIS-PMQCC-009-002-

UNIT TITLE: Color Monitor Calibration Procedures

TPFN HOURS AND TYPE: 2 L

TPFN TOTAL HOURS: 2

PREREQUISITE TPFN:

TASK(S): Identify and define procedures for:

- 001 Calibration vs. characterization
- 002 Dynamic range
- 003 Calibration hardware
- 004 Calibration software

SUMMARY OF ACTIVITIES: Topics of discussion will include building, evaluating and tuning ICC profiles in preparation for AFIS-PMQCC-009-003-.

REFERENCES:

Kodak Colorflow Monitor Profile Builder User's Guide and Reference
Kodak Colorflow ICC Production Tools User's Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (L)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 9
COLOR MANAGEMENT FOR DIGITAL IMAGING

TPFN: AFIS-PMQCC-009-003-

UNIT TITLE: Color Monitor Color Calibration

TPFN HOURS AND TYPE: 2 D; 2 PE; 2 EP

TPFN TOTAL HOURS: 6

PREREQUISITE TPFN: AFIS-PMQCC-009-002-

TASK(S): 001 Demonstrate and perform calibration of a color monitor.

SUMMARY OF ACTIVITIES: Students calibrate and characterize two computer monitors using Kodak Colorflow Monitor Profile Builder software and the DTP-92 colorimeter.

REFERENCES:

Kodak Colorflow Monitor Profile Builder User's Guide and Reference
Kodak Colorflow ICC Production Tools User's Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (PE, D); 1:4 (EP)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 9
COLOR MANAGEMENT FOR DIGITAL IMAGING

TPFN: AFIS-PMQCC-009-004-

UNIT TITLE: Digital Camera Profiles

TPFN HOURS AND TYPE: 2 PE; 2 EP

TPFN TOTAL HOURS: 4

PREREQUISITE TPFN: None

TASK(S): 001 Demonstrate and perform digital camera profile building

SUMMARY OF ACTIVITIES: Students produce an ICC compliant profile for a digital camera using Kodak Colorflow software. Students are encouraged to bring a digital camera from their unit of assignment.

REFERENCES:

Kodak Colorflow Profile Editor User's Guide and Reference
Kodak Colorflow ICC Production Tools User's Guide
Kodak Colorflow Digital Camera Production Guide
Kodak Colorflow Digital Camera Profile Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (PE), 1:4 (EP)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 9
COLOR MANAGEMENT FOR DIGITAL IMAGING

TPFN: AFIS-PMQCC-009-005-

UNIT TITLE: Characteristics and Principles of Input/Output Devices

TPFN HOURS AND TYPE: 4 L

TPFN TOTAL HOURS: 4

PREREQUISITE TPFN: None

TASK(S): Identify and define:
001 Inkjet, thermal, and dye-sublimation printers.
002 Preparing images for the Internet.

SUMMARY OF ACTIVITIES: This is an in-depth study of the various types of printers used in photography. Students compare ink-jet, thermal and dye-sublimation printers and define how each is characterized in the CMYK color space. In preparing images for the Internet, topics such as image resolution and file size will be analyzed.

REFERENCES:

Kodak Colorflow Profile Editor User's Guide and Reference
Kodak Colorflow ICC Production Tools User's Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (L)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 9
COLOR MANAGEMENT FOR DIGITAL IMAGING

TPFN: AFIS-PMQCC-009-006-

UNIT TITLE: Color Digital Output Device Calibration

TPFN HOURS AND TYPE: 2 D; 2 L; 2 PE; 2 EP

TPFN TOTAL HOURS: 8

PREREQUISITE TPFN: AFIS-PMQCC-009-005

TASK(S): Identify and define procedures for color calibration of a color output device:

- 001 Calibration vs. characterization.
- 002 Calibration software.
- 003 Calibration hardware.
- 004 Targets and resolution.
- 005 Calibrate a color digital output device.

SUMMARY OF ACTIVITIES: Students produce an ICC compliant profile for a color printer using Kodak Colorflow software and the DTP-41 spectrophotometer.

REFERENCES:

Kodak Colorflow Profile Editor User's Guide and Reference
Kodak Colorflow ICC Production Tools User's Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (L, PE, D); 1:4 (EP)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 9
COLOR MANAGEMENT FOR DIGITAL IMAGING

TPFN: AFIS-PMQCC-009-007-

UNIT TITLE: Color Calibration of Color Scanner

TPFN HOURS AND TYPE: 2 D; 2 L; 2 PE; 2 EP

TPFN TOTAL HOURS: 8

PREREQUISITE TPFN: None

TASK(S): Identify and define procedures for color calibration of a color scanner:

- 001 Calibration vs. characterization.
- 002 Calibration software.
- 003 Calibration Hardware.
- 004 Targets and resolution
- 005 Calibrate a color scanner

SUMMARY OF ACTIVITIES: Students build, evaluate and tune an ICC compliant profile for a flatbed and a color 35mm film scanner using Kodak Colorflow software and input and evaluation targets.

REFERENCES:

Kodak Colorflow Profile Editor User's Guide and Reference
Kodak Colorflow ICC Production Tools User's Guide

INSTRUCTOR/STUDENT RATIO: 1:8 (L, PE, D); 1:4 (EP)

SAFETY FACTORS: Normal

FUNCTIONAL AREA 9
COLOR MANAGEMENT FOR DIGITAL IMAGING

TPFN: AFIS-PMQCC-009-008

UNIT TITLE: Measurement

TPFN HOURS AND TYPE: 2 EW; 3 L

TPFN TOTAL HOURS: 5

PREREQUISITE TPFN: AFIS-PMQCC-009-001 through AFIS-PMQCC-009-007

TASK(S): 001 Course review.
 002 Written test.
 003 Written test – remedial.

SUMMARY OF ACTIVITIES: Self-explanatory.

REFERENCES:

See AFIS-PMQCC-009-001- through AFIS-PMQCC-009-007-

INSTRUCTOR/STUDENT RATIO: 1:8 (EW), 1:8 (L)

SAFETY FACTORS: Normal

**FUNCTIONAL AREA 10
ADMINISTRATION**

TPFN: AFIS-PMQCC-010-001-

UNIT TITLE: Course Administration

TPFN HOURS AND TYPE: 6 AD

TPFN TOTAL HOURS: 6

PREREQUISITE TPFN: N/A

TASK(S):

001	Inprocessing.
002	Course critique.
003	Outprocessing.
004	Graduation.

SUMMARY OF ACTIVITIES: Self-explanatory.

REFERENCES: DINFOS Policy and Procedures Manual

INSTRUCTOR/STUDENT RATIO: 1:8(AD)

SAFETY FACTORS: N/A